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IS 4910-11 (1989): Methods of Test for Tyre Yarns, Cords and Tyre Cord Warpsheets Made from Man-Made Fibres, Part 11: Commercial Mass [TXD 1: Physical Methods of Tests]



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Indian Standard

**METHODS OF TEST FOR
TYRE YARNS, CORDS AND TYRE CORD
WARPSHEETS MADE FROM MAN-MADE FIBRES**

PART 11 COMMERCIAL MASS

(*First Revision*)

भारतीय मानक

**कृत्रिम रेशों से निर्मित सूत डोरी और टायर डोरी ताना चट्टरों की
परीक्षण पद्धतियाँ**

भाग 11 वाणिज्यिक संहति

(पहला पुनरीक्षण)

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FOREWORD

This Indian Standard (Part 11) (First Revision) was adopted by the Bureau of Indian Standards on 15 July 1989, after the draft finalized by the Physical Methods of Test Sectional Committee had been approved by the Textile Division Council.

This standard was first published in 1971 and has been revised for incorporating changes on the basis of experience gained during its use.

In the preparation of this standard, due weightage has been given to the testing practices followed in the country in this field.

This standard forms a part of series of standards under the title 'Methods of test for tyre yarns, cords and tyre cord warpsheets made from man-made fibres'.

The methods prescribed in the standard presume that the mass of each individual container in the lot would be specified by the seller in the invoice note.

In reporting the results of a test made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'.

Indian Standard

METHODS OF TEST FOR TYRE YARNS, CORDS AND TYRE CORD WARPSHEETS MADE FROM MAN-MADE FIBRES

PART 11 COMMERCIAL MASS

(First Revision)

1 SCOPE

1.1 This standard (Part 11) prescribes methods for determination of commercial mass of consignments of man-made fibres, tyre yarns, cords and tyre cord warpsheets.

1.1.1 This standard is applicable to dipped as well as undipped material:

2 REFERENCES

2.1 The following Indian Standard is a necessary adjunct to this standard:

IS No.	Title
IS 4910 (Part 4) : 1989	Methods of test for tyre yarns, cords and tyre cord warpsheets made from man-made fibres : Part 4 Dippick-up

3 PRINCIPLE

3.1 The commercial mass is obtained by adding a mass corresponding to commercial moisture regain to the oven-dry mass of the consignment which is determined by testing a representative sample of the material in the consignment.

4 SAMPLING

4.1 Sample from the lot shall be drawn so as to be representative of the lot. Sample drawn in accordance with the relevant material specification or as agreed to between the buyer and the seller shall be held to be representative of the lot.

5 METHODS

5.1 This standard covers two methods for determination of commercial mass of consignments of :

- a) packages with single thread, and
- b) warpsheet in rolls.

6 METHOD A — PACKAGES WITH SINGLE THREAD

6.1 Place immediately the selected yarn or cord package with its support package and packing

material in an air-tight tared vessel and determine its mass. Afterwards determine the net mass (W_n) of the material in each yarn or cord package by deducting the mass of the tared vessel, packing material and support of package used.

NOTE — In case of large packages weighing 1.5 kg or more, the method given in Annex A may be followed if agreed to between the concerned parties.

6.2 Cut the material (yarn or cord) from the package and determine its oven-dry mass (W_o).

6.3 In case of dipped material, the amount of dip present in the material shall be determined as given in IS 4910 (Part 4) : 1989.

6.4 Determine the net mass (W_n) of material (yarn or cord) of each sampled container (box) by deducting the mass of the packing material and the corresponding mass of supports of packages, etc from the total mass. The total mass of package represents the mass of the support packages, packing material, the yarn or cord material and the container in which the packages are packed.

6.5 Calculate the commercial mass in kg of each sampled container by the following formula:

$$\text{Commercial mass of the material of sampled container} = \frac{100 + R}{100} \times \frac{W_o}{W_n} \times W_n$$

where

R = commercial moisture regain, percent (see Notes 1 and 2);

W_o = oven-dry mass of the material in the package (see 6.2);

W_n = net mass of the material in (sampled) package (see 6.1); and

W_e = net mass of the material of the sampled container (box).

NOTES

1 Unless otherwise agreed to between the buyer and the seller, the standard moisture regain values for specified fibres are given below:

Sl No.	Material	Commercial Moisture Regain, Percent
i)	Natural cotton yarn	7.0
ii)	Rayon	13.0
iii)	Nylon (polyamide)	4.5
iv)	Polyester	0.4

2 The standard moisture regain is also sometimes termed as commercial moisture regain in the trade.

6.6 Determine the commercial mass of the consignment by the following formula:

$$\text{Commercial mass of consignment} = \frac{\text{Invoice mass of consignment} \times \text{Commercial mass of material of the sampled container}}{\text{Invoice mass of the material of the sampled container}}$$

7 METHOD B — WARPSHEET IN ROLLS

7.1 Cut the test pieces provided at the end of the sampled warpsheet rolls in full width for the purpose of testing. Determine its length. Also determine the oven-dry mass of warp, W_1 , and weft, W_2 , in test specimen separately.

7.2 Determine the full length of the fabric piece L .

7.3 In case of dipped material, the amount of dip present in the material shall be determined as given in IS 4910 (Part 4) : 1989.

7.4 Calculation

Calculate the commercial mass in kg of the sampled warpsheet roll by the following formula:

$$\begin{aligned} \text{Commercial mass of sampled warp-sheet roll} = & \frac{100 + R_1}{100 \times 1000} \times \frac{L}{l} \times W_1 \\ & + \frac{100 + R_2}{100 \times 1000} \times \frac{L}{l} \times W_2 \end{aligned}$$

R_1 and R_2 = Commercial moisture regains for warp and weft threads respectively (see Note 1 and 2 under 6.5),

L = length of the fabric in m,

l = length of test piece in m,

W_1 = oven-dry mass of warp yarn in the test specimen in g, and

W_2 = oven-dry mass of corresponding weft yarn in the test specimen in g.

7.5 Determine the commercial mass of the consignment by the following formula:

$$\begin{aligned} \text{Commercial mass of consignment} = & \frac{\text{Invoice mass of consignment} \times \text{Commercial mass of sampled warpsheet rolls}}{\text{Invoice mass of sampled warpsheet rolls}} \end{aligned}$$

8 REPORT

8.1 The report shall include the following:

- Type of the material,
- Invoice mass of the consignment,
- Commercial mass of the consignment,
- Standard moisture regain value used, and
- Dip allowance value used.

ANNEX A

(Clause 6.1, Note)

SPECIAL METHOD OF DETERMINING THE COMMERCIAL MASS OF LARGE PACKAGES

A-1 PRINCIPLE

A-1.1 This method is based on the measurement of total length of yarn on the package and on the determination of oven-dry mass of the yarn per unit length.

A-1.1.1 Under well defined conditions, the oven-dry mass of the whole package can be deduced.

A-2 APPARATUS

A-2.1 The apparatus shall consist of a winding frame fitted with a device enabling the length of yarn wound-on to be measured to within about one percent.

A-2.2 Winding Frame

The winding frame shall have a speed not greater than 200 m/min. The unwinding tension shall be maintained in the range of 5 ± 1 mN/tex.

A-2.3 Length Measuring Device

This device consists of a measuring roller A of uniform diameter (not less than 100 mm of hard, smooth material) on the shaft of which is mounted a revolution counter as shown in Fig. 1. A roller of soft material B presses against the measuring roller. The load applied to the pressure roller shall not be less than 100 g/cm of the line of contact between the two rollers. Check the surface of the measuring roller at frequent intervals to ensure that it is in good condition.

A-2.3.1 Check to ensure that there is no slippage:

- by testing the accuracy of the readings given by the revolution counter after repeated winding of the same piece of yarn. Some discrepancies may arise from the possible crushing of the yarn between the rollers or from change in twist during repeated

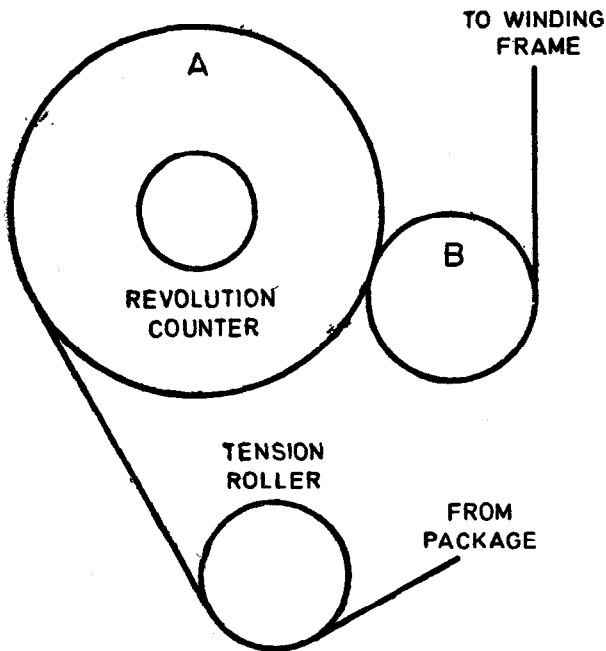


FIG. 1 LENGTH MEASURING DEVICE

winding off. These discrepancies may be tolerated provided they do not exceed 0.05 percent for each rewind, and

- b) by comparing the readings given by the length measuring device with those given by an accurate, carefully calibrated wrapreel.

A-3 PACKAGE SAMPLING SCHEME

A-3.1 While the yarn is being unwound from the package, take known lengths l_2, l_3, l_4 and l_5 , accurate to within 0.1 percent, corresponding to a mass of about 40 g at four points equally distributed throughout the package as shown in Fig. 2.

A-3.2 Apart from these four samples, take two similar samples from the two ends of the package of known lengths l_1 and l_6 .

A-3.3 At the same time, note the lengths L_1, L_2, L_3, L_4 and L_5 of yarn wound off between each sampling.

In this manner six samples are obtained from which the finish shall be removed before they are dried and weighed in the oven-dry state.

A-4 CALCULATIONS

A-4.1 Oven-Dry Mass of Package

A-4.1.1 Determine the oven-dry mass per unit length Al_j for each sample as follows :

$$Al_j = \frac{A_j}{l_j}$$

where

$j = 1, 2, \dots, 6$;

A_j = oven-dry mass of the j th sample; and

l_j = corresponding length measured on the winding frame.

A-4.1.2 Determine the oven-dry mass $AL_1, AL_2, \dots, AL_5$ of the lengths $L_1, L_2, \dots, L_5$, respectively of the package as follows:

$$AL_1 = L_1 \frac{Al_1 + Al_2}{2}$$

$$AL_2 = L_2 \frac{Al_2 + Al_3}{2}$$

$$\dots\dots\dots$$

$$AL_5 = L_5 \frac{Al_5 + Al_6}{2}$$

A-4.1.3 Determine the oven-dry mass of the complete package as follows:

$$A_j = \sum_{j=1}^6 A_j + \sum_{j=1}^5 AL_j$$

A-4.2 Commercial Mass of Package

Determine the commercial mass of the sampled package as follows:

$$\text{Commercial mass of the material of the sample package} = A_j \times \frac{100 + R}{100}$$

where

A_j = oven-dry mass of the material of the sampled package (see B-4.1.3), and

R = commercial moisture regain value used (see Notes 1 and 2 under 6.5)

A-4.3 Commercial Mass of Consignment

Determine the commercial mass of the consignment by the following formula:

$$\text{Commercial mass of consignment} = \text{Invoice mass of consignment}$$

$$\times \frac{\text{Commercial mass of sampled package}}{\text{Invoice mass of sampled package}}$$

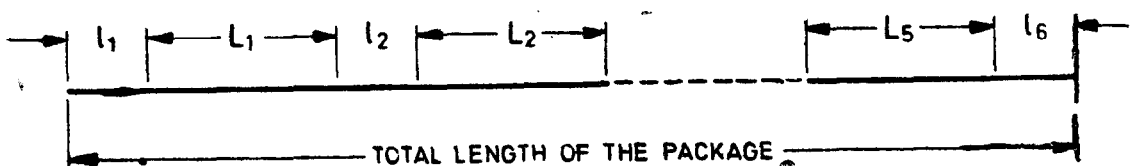


FIG. 2 ARRANGEMENT OF YARN LENGTHS

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